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CRISIS

What it means to oil marketers

Marketer prospers with 'blue chip' assets

Retail outlet count: 202,443

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Editor's Viewpoint

In 1972, there were 226,459 gasoline service stations in the United States. It was a high-water mark for our retail gasoline industry, a station population figure that has never been equaled, before or since.

Back then, that was a number in which everyone had confidence, *NPN* editors included. The U.S. Census Bureau, which cranked out an official retail head count every five years, was *the* source for this data. We had no reason to doubt the Census figures; they were backed by the authority of the federal government, with required reporting from every retailer.

Nor did we worry all that much about the definition of a *true* service station. A "conventional" service station was just about the only place a motorist could buy gasoline. Typically, it was a facility not unlike its 226,000 brethen across the land. It had two or three service bays (backrooms) for fixing customers cars (194,000 of the total stations were of this type). Self-service dispensing was still in its infancy; full-service was the norm just about everywhere. Only a small minority of stations had convenience stores attached (or, if you like, only a few C-stores had gasoline pumps out front.)

On the whole, it was a homogeneous marketplace. We had a good grasp of the dimensions of the market—number of stations, where they were, facility type, that sort of data. As we all know, however, the petroleum market began changing dramatically, beginning about 1973 with the first oil embargo. Self-service gasoline began its explosive growth. Jobbers, independents, C-store companies and even a few majors rushed to jump aboard the combination gasoline/C-store bandwagon. Car washes, too, became more prominent in the gasoline marketing scene.

Somewhere along the line we began to lose track of the true scope of the retail gasoline market. The Census people narrowed their survey focus to what they defined as "primary" retail gasoline outlets, those with payrolls and at least 50% of their sales in gasoline. Unfortunately, this counting procedure resulted in a distorted picture of the gasoline market. The Census Bureau tells us that the number of stations declined from 226,000 in 1972 to 114,000 in 1987, a 50% drop. If you're only interested in the number of conventional-type stations, that figure is probably correct.

But what about the tens of thousands of C-stores and other facilities that have became a very prominent (and very competitive) part of the market, accounting for billions of gallons of gasoline sales each year? It is unrealistic, and self-defeating, not to consider these outlets as full-fledged members of the gasoline marketing fraternity.

This is why *NPN* editors decided last year to begin putting the dimensions of the retail market back into a more realistic and accurate perspective than has been available for many years. Our figures, as shown on p42, are not perfect yet; we're only one year into this new counting procedure. But they're the best figures available, and we're working hard to make them better in years to come.

—Don Smith

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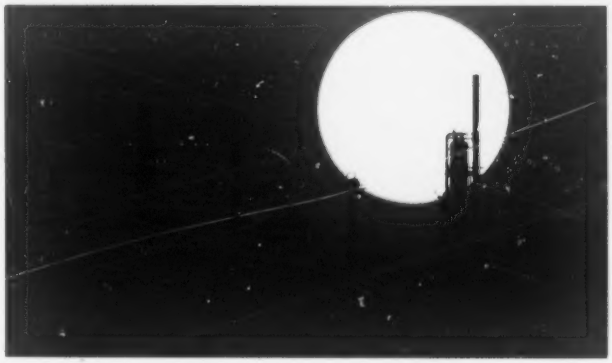

1992 Retail Outlet Population

	Total Outlets			
	NPN Survey		Census Data	
	1992(a)	1991(a)	1987(b)	1972(c)
Alabama	5,500	6,500	2,229	4,510
Alaska	295	300	214	241
Arizona	4,425	4,010	1,241	2,357
Arkansas	3,502	3,764	1,357	3,144
California	13,140	13,600	9,812	19,513
Colorado	3,725	3,400	1,566	3,170
Connecticut	1,850	1,900	1,671	2,798
Delaware	508	450	279	557
Dist. of Col.	180	134	115	316
Florida	10,052	10,152	5,933	9,199
Georgia	7,000	7,000	3,273	6,730
Hawaii	407	392	355	460
Idaho	1,073	1,123	588	1,193
Illinois	5,749	10,100	4,655	10,211
Indiana	3,901	4,500	2,854	6,235
Iowa	3,783	4,159	2,020	2,613
Kansas	2,896	3,062	1,576	3,609
Kentucky	2,950	2,446	2,056	3,921
Louisiana	9,497	6,500	1,934	3,921
Maine	1,500	700	573	1,224
Maryland	2,245	2,450	1,646	3,012
Massachusetts	4,500	2,500	2,736	4,696
Michigan	6,905	8,500	4,164	8,919
Minnesota	3,157	3,598	2,289	4,585
Mississippi	6,127	6,000	1,374	2,727
Missouri	5,895	7,200	3,119	6,260
Montana	1,432	1,400	548	1,195
Nebraska	2,008	3,000	1,153	2,265
Nevada	694	450	441	798
New Hampshire	1,069	1,050	534	868
New Jersey	3,800	3,860	3,791	5,768
New Mexico	1,658	2,066	696	1,831
New York	7,000	6,800	5,982	11,358
North Carolina	10,244	10,643	3,547	6,946
North Dakota	863	1,245	471	910
Ohio	6,632	8,205	5,362	11,723
Oregon	2,091	2,165	1,352	2,828
Oklahoma	4,450	4,700	1,705	4,153
Pennsylvania	5,790	6,000	5,192	11,256
Rhode Island	703	600	467	901
South Carolina	4,776	5,200	1,833	3,720
South Dakota	1,245	1,245	556	1,171
Tennessee	6,000	6,000	2,491	5,147
Texas	9,900	11,900	8,568	17,118
Utah	2,116	2,137	849	1,504
Vermont	854	856	569	596
Virginia	5,400	5,000	2,740	4,648
Washington	5,308	3,500	2,063	3,945
West Virginia	2,700	2,800	1,013	2,156
Wisconsin	4,388	5,074	2,735	5,162
Wyoming	1,175	1,372	415	772
Total U.S.	202,443	210,120	114,748	226,459

(a) The completion embraces all outlets where gasoline is sold at retail. It includes service stations, convenience stores, car washes, etc. A universe, in effect, of retail gasoline outlets. The surveys were completed in March 1992 and January 1991, respectively.
(b) These are the U.S. Bureau of the Census figures for 1987, but include only those service stations that have employees and payrolls and generate more than half their income from gasoline sales. Automatically excluded were convenience stores, car washes, etc.
(c) These are the U.S. Bureau of the Census figures for 1972 and are generally considered a "universe count" because only a handful of places, beyond orthodox service stations, sold gasoline at retail at that time.

Sources: NPN state by state telephone survey for 1992 and 1991; U.S. Bureau of the Census, Census of Retail Trade, 1987 and 1972.

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• TRENDS

Free Market in Pollution Rights Is Coming Soon

A trading market in pollution rights is an idea whose time appears to have come. It has been talked about nationally and on futures exchanges for some time, but now the South Coast Air Quality Management District (SCAQMD) in California has decided to launch such a free market next year. Many eyes will be watching.

Proponents—and there are many—believe trading pollution rights will give businesses greater flexibility in meeting environmental regs. Businesses that beat regulatory timetables get credits they can sell to those that can't or chose not to meet standards. Opponents fall in two categories: environmentalists who think businesses will use the program to escape cleanup somehow, adding to pollution; and those who think the market won't work. Some of the latter aren't against the program in principle, but think some of the specific ground rules will kill it.

The EPA proposed in December to allow the sale of rights to emit a certain amount of pollutants, starting in 1993. Initially 25,000 allowances would be sold directly to buyers at a fixed price of $1,500 each and about 250,000 would be sold at auction.

The Chicago Board of Trade, a commodity exchange, is seeking approval to begin trading of pollution allowance futures. This level of sophistication is a measure of the thought that has been given to the subject.

The SCAQMD is preparing a trading plan, with startup scheduled hopefully in early '93. The "Regional Clean Air Incentive Market" (RECLAIM), will eliminate conventional poilution controls on individual sources, such as refinery stacks and industrial boilers, and substitute separate markets for three pollutants—reactive organic gases (hydrocarbons), nitrogen oxides and sulfur oxides. Petroleum refineries would participate in all three markets.

SCAQMD will pick the 2,700 largest polluters of a district total of 17,000. Each would be assigned a share of total emissions based on its history. Over the first 10 years, the value of each share of reactive organic gases would decline 5% annually, nitrogen oxides 8% annually and sulfur oxides 8.5% annually. In other words, that percentage of cleanup would have to be attained annually or the company would have to buy rights from others. This is how cleanup would be achieved.

Arco opposes the plan as presently drawn because the scheduled emission reduction of about 85% during the period is "unreasonable and unimaginably cost prohibitive," Arco Products Co. President George H. Babikian told the board. He predicted a mass business exodus from the state and estimated it would cost Arco more than $250-million the next four years to meet the proposed reductions. But he added that Arco plans to remain in California, although "the company does not know how to make these annual reductions with existing technology."

Charles W. Aarni, Chevron regulatory agency liaison representative, expresses optimism that RECLAIM would work when it shakes down. He says, "One of the benefits of the program is that it provides a real economic incentive to develop new technologies. Under the current program, there's not a real strong incentive to go out and do a better job, because if you figure out how to do it better, then that will just be mandated for everybody else.

"Under the RECLAIM program, you can market that technology to everybody else, and they will have a strong incentive to use it if it's cost effective. I think it could provide some real positive incentives for developing ways that are better and cheaper. That's the key to it."

Aarni agrees with Arco, however, that the cleanup needs a limit. "One of the objections Arco has made—and I think they're absolutely right—is you have to pick a reasonable stopping point for the program. That stopping point needs to be identified in advance, and you have to know what it is." He says the SCAQMD staff knows this and will provide for it.

Whether the trading of pollution rights on a free market will ever reach down to the petroleum marketer level isn't clear. It won't in the California plan, as presently conceived, but perhaps will elsewhere as the idea spreads.

—Mark Emond

• MARKETPLACE AT A GLANCE

AVERAGE GASOLINE PRICES IN THE U.S. (per gal.)

JANUARY	Gasoline (All types)	Leaded Regular	Unleaded Regular	Unleaded Premium
U.S. City Avg.	$1.135	*	$1.073	$1.267
Regions				
Northeast	1.237	*	1.160	1.367
North Central	1.064	*	1.028	1.194
South	1.132	*	1.058	1.244
West	1.129	*	1.086	1.272

** Data no longer collected or available.*
Source: U.S. Dept. of Labor, Bureau of Labor Statistics.

STOCKS (Add 000 bbl.)

	2/28/92	3/1/91
Gasoline (Total)	229,579	222,576
Unleaded*	185,962	172,632
Jet Kerosine	38,580	42,591
Distillates	108,427	103,258
Residual	42,909	46,014

**Leaded regular prices no longer collected by Bureau of Labor Statistics.*
Source: American Petroleum Institute.

Self-Serve Preference Still Growing

American motorists are pumping their own gasoline at a record pace as self-serve gasoline sales reached 85% of all gasoline dispensed last year. That's a 2% hike from the like period in 1990, according to market research conducted by Chicago-based Amoco Oil Co.

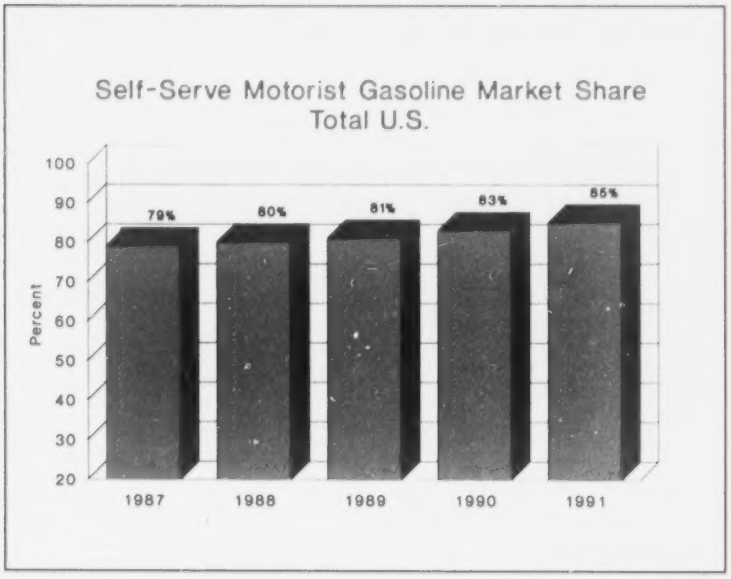
Competitive prices, quick service and the increasing availability of self-serve 24-hour service stations all contributed to the increase.

"Our research indicates that continued increases in the popularity of self-serve facilities can be expected in the next few years as the industry continues to update stations to meet the changing needs of today's motorists," says Harvey Carroll, market research specialist for Amoco.

The 1991 survey shows that self-serve market share in the U.S. increasing in 44 states and the District of Columbia. The largest gains were in New Hampshire and Pennsylvania, where market share in both states increased 6% to 77% overall.

Arizona, Colorado, Florida and New Mexico led the nation in self-serve usage with 96%, closely followed by Nevada, Texas, Utah and Washington at 95%, according to Amoco.

The self-serve market share declined by 1% in Utah and remained status quo in Wyoming. Self-serve facilities are prohibited in Oregon and New Jersey.



Self-Serve Motorist Gasoline Market Share by State (Percent) Total 1991 vs. Total 1990

State	1991	1990	Chg.
Alabama	88	85	+3
Arizona	96	95	+1
Arkansas	89	87	+2
California	94	93	+1
Colorado	96	95	+1
Connecticut	81	77	+4
Delaware	92	88	+4
Dist. of Col.	91	89	+2
Florida	96	94	+2
Georgia	93	91	+2
Idaho	92	91	+1
Illinois	93	91	+2
Indiana	90	89	+1
Iowa	91	87	+4
Kansas	90	87	+3
Kentucky	84	83	+1
Louisiana	94	93	+1
Maine	65	62	+3
Maryland	90	89	+1
Massachusetts	62	57	+5
Michigan	92	90	+2
Minnesota	88	86	+2
Mississippi	89	86	+3
Missouri	90	88	+2
Montana	93	92	+1
Nebraska	87	83	+4
Nevada	95	94	+1
New Hampshire	77	71	+6
New Mexico	96	92	+4
New York	67	63	+4
North Carolina	93	91	+2
North Dakota	87	84	+3
Ohio	91	88	+3
Oklahoma	90	89	+1
Pennsylvania	77	71	+6
Rhode Island	73	71	+2
South Carolina	93	91	+2
South Dakota	85	83	+2
Tennessee	90	87	+3
Texas	95	93	+2
Utah	95	96	-1
Vermont	68	61	+7
Virginia	93	91	+2
Washington	95	94	+1
West Virginia	85	81	+4
Wisconsin	93	92	+1
Wyoming	87	87	NC

Chevron Reports Savings From New Fuel Delivery Software

Chevron Corp., San Fransisco, says a field test of new fuel delivery software has successfully reduced costs at 130 company-operated outlets in the Dallas region. Software used in the test was developed by Applied Information Management Systems, Inc. (AIMS), Monroe, La.

Chevron officials note savings have been achieved in reducing returns (when a delivery truck has to return with fuel still in it) and run outs (when an underground storage tank runs out of fuel). The AIMS system uses store-based touchtone telephone hookups that transmit daily tank inventory data to a home office personal computer. This information is then used to dispatch daily fuel deliveries to company outlets.

Chevron territory manager Jerry Turner reports a savings of $40,000 and $33,500 for the month of February, respectively, in reduced returns and run outs. He adds that those savings figures don't include improved truck utilization or the pricing aspects of the program. The AIMS system cost Chevron $11,000-$12,000, Turner says.

The new system also eliminated the need for EPA testing of underground storage tanks at $6,000/site, Turner says, since the system itself checks the tanks two times a year.

Turner says Chevron plans to expand the AIMS system into Houston, New Orleans and the company's entire central region.

Officials with AIMS say they are in negotiations with several major oil companies for future deals with their system, including the Canadian arm of one major oil company. Sources say that for the Canadian project, AIMS is reprogramming the software to accommodate the metric system.

REFINERY CRISIS:
What It Means to Oil Marketers

The refinery landscape in the United States is due for big changes. Oil marketers are forewarned to become as well-informed as possible about how their suppliers are reacting to environmental regulations, and also to keep making best judgments on whether their suppliers will pull out of one market or another or go under.

Marketers' futures depend on it. Many independent refiners, especially the smaller ones, won't be able to come up with the huge investments required to market reformulated gasolines and diesel fuels in markets that have too much air pollution.

By Mark Emond
Staff Reporter

These markets are determined by the federal Environmental Protection Agency (EPA) and various other environmental agencies at state, county or local levels.

The federal Clean Air Act Amendments of 1990 (CAAA) call for gasolines that will have to be modified substantially during the remainder of the decade. EPA is empowered to regulate what must be done. In the process, it is sealing the fate of some refiners.

The regulatory climate is very complex and getting more so, but here's a brief summary of the principal issues facing refiners—and indirectly marketers. This summary will be expanded to show where refiner vulnerabilities are so that marketers can get ready for withdrawals and failures.

In a nutshell

Most vulnerable to the new regulations are refineries that make gasoline to sell in "nonattainment areas," that is, areas where the air has not attained a level of cleanness established by the EPA or other agency. The federal regulatory standards apply to two classes of pollutants: ozone and carbon monoxide (CO).

There are nine metropolitan areas considered dirtiest in ozone, but there are 87 more in various degrees of noncompliance with EPA standards (see box). Gasoline sold in the nine

areas will have to be reformulated by 1995.

The remaining areas can voluntarily join the program, with EPA approval. This possibility is potentially overwhelming for refiners. EPA can delay the requested participation up to three years, which is a buffer, but of unknown proportions. This is a huge unknown factor that will have to be minimized before most refiners can know what to do. More than half of the U.S. population resides in these areas, mostly metropolitan.

In the nine worst areas and any others that opt in, gasoline will have to be reformulated to reduce emission of components that increase ozone levels. Final specifications have not been determined, but EPA already requires by 1995 the elimination of lead, a maximum of 25% by volume of aromatic compounds, a maximum of 1% by volume of benzene and a minimum of 2% by weight of oxygen.

The CAAA also requires that volatile organic compounds (VOCs) and toxic emissions be reduced 15% by 1995 and 25% or more by 2000.

Although the final rules for 1997 have not been specified in this case either, negotiations with the oil industry have produced a tentative agreement on how to achieve these standards: limiting volatility (RVP, or Reid Vapor Pressure) to 7.2-psi (lb./sq.in.) at the pump in southern ozone nonattainment areas (Class B) and 8.1-psi in northern ozone nonattainment areas (Class C). In both cases, the limits are lower at the refinery gate to ensure compliance at the point of purchase.

A total of 41 areas—3 serious and 38 moderate (see box)—fail to meet EPA standards for atmospheric carbon monoxide levels in the winter. They represent 27% of the U.S. gasoline market. The CAAA requires that beginning in November 1992 gasoline sold in those areas must contain, on average, 2.7% oxygen by weight.

Most refiners plan to do this with MTBE (methyl tertiary butyl ether), if they can obtain enough to meet their requirements (see sidebar). Ethanol also

CARBON MONOXIDE (CO) NONATTAINMENT AREAS (41)

Serious Areas

Los Angeles-Anaheim-Riverside, Calif.
Steubenville-Weirton, Ohio, W.Va. (nonmobile)
Winnebago Co., Wis. (Oshkosh) (nonmobile)

Moderate Areas

Albuquerque, N.M.
Anchorage, Alaska
Baltimore, Md.
Boston-Lawrence-Salem, Mass., N.H.
Chico, Calif.
Cleveland-Akron-Lorain, Ohio
Colorado Springs, Colo.
Denver-Boulder, Colo.
Duluth, Minn., Wis.
El Paso, Texas
Fairbanks, Alaska
Fort Collins-Loveland, Colo.
Fresno, Calif.
Greensboro-Winston Salem-High Point, N.C.
Hartford-New Britain-Middletown, Conn.
Josephine Co., Ore.
Klamath Co., Ore.
Las Vegas, Nev.
Medford, Ore.
Memphis, Tenn., Ark., Miss.
Minneapolis-St. Paul, Minn., Wis.
Missoula Co., Mont.
Modesto, Calif.
New York-No. N.J., Long Island, N.Y., N.J., Conn.
Philadelphia, Wilmington, Trent, Pa., N.J., Del., Md.
Phoenix, Ariz.
Portland-Vancouver, Ore., Wash.
Provo-Orem, Utah
Raleigh-Durham, N.C.
Reno, Nev.
Sacramento, Calif.
San Diego, Calif.
San Francisco-Oakland-San Jose, Calif.
Seattle-Tacoma, Wash.
Spokane, Wash
Stockton, Calif.
Syracuse, N.Y.
Washington, D.C., Md., Va.

will be used, but its role is not clear at this time. Some marketers say it is being priced out of the picture in some areas where it does not have tax exemptions.

In summary, according to federal regulations, refiners must include oxygenates in gasoline in those areas during the winter in 1992, produce reformulated gasoline in 1995 and produce even stricter reformulated gasoline in 1997 and again in 2000.

For diesel fuel, the CAAA requires a reduction of the sulfur content to no more than 0.05% (1/2 of 1%) by weight beginning in October 1993. This reduction applies to the entire nation and will affect about 42% of diesel fuel and home heating oil consumption.

Plans and preparedness

It becomes obvious that, in the case of gasoline, a refinery's marketing area has a lot to do with how much or little it decides to do to the plant, what or how much of products to make or not make and where to sell or not to sell. These decisions will affect marketers who buy or plan to buy from the refiner in the future.

The key questions are "What are refiners doing, if anything?" and "What do they plan to do in the future, if anything?"

A survey of refiners by Cambridge Energy Research Associates (CERA) for the Dept. of Energy analyzes the degree of preparedness of refiners to meet the requirements of the CAAA, shedding much light on the strong and the vulnerable. CERA is a heavyweight research organization whose president is Daniel Yergin, energy specialist, author of the recently acclaimed history of the oil industry, *The Prize: The Epic Quest for Oil, Money & Power*.

From the more than 100 refining companies operating in the U.S., CERA obtained confidential responses from 35, representing 50% of U.S. refining capacity. The companies operate 85 refineries ranging in output from 8,000 b/d to more than 400,000 b/d. The survey includes at least 40% of the refineries in all regions of the U.S. except PADD 5 (West Coast), which is dominated by a few majors, where 13 refineries were included.

On reformulated gasoline, the survey reveals a broad range of plans, from refiners planning to produce none to some planning to produce 100%.

The refinery improvements planned are broadly dependent on the market position of the refiner: those with a large share of their production going into one or more of the nine worst ozone nonattainment areas, those with large market share in one or more of the 87 other areas that could opt into the programs and those that sell little or no gasoline into areas that are or might be covered by CAAA.

Refiners that supply a significant portion of their gasoline volume into one or more of the worst ozone nonattainment areas seem to have the most fully developed plans, CERA says.

Many of the independents, smaller refiners and Midcontinent/Rocky Mountain refiners are less certain about their plans. There are three major causes for this uncertainty: (1) whether cities in their trade areas would opt in and require reformulated gasoline, and if so, when; (2) lack of definitions of exactly what gasoline specifications they eventually would be required to meet; and (3) uncertainty surrounding the administration and enforcement of CAAA regulations.

As to the uncertain opt-ins, CERA says there is a wide variety of plans for dealing with them. Generally, the planned actions depend on the refiner's size, financial strength and estimates of the impact of opt-ins and other factors on its particular market. Here's the range of plans:

- Some companies with small volumes going into potential opt-in areas are planning no changes in their operations. If areas where these companies are currently supplying gasoline opt in, these refiners plan to pull out of those areas and concentrate on others.
- Other refiners are taking a wait-and-see attitude—holding off on any commitments until the opt-in situation clarifies. However, they plan to modify their operations eventually if needed.
- Typically, refiners planning no immediate changes are smaller independents, many located in the Midcontinent area.
- Finally, there are a number who plan to take immediate steps toward reformulating their entire pool in anticipation of widespread opt-ins.

CERA concludes that despite the uncertainties, most refiners do have at least a preliminary assessment of what changes they would eventually make and how much they would cost. Nearly everyone is studying the issues extensively.

Refiners may find themselves making even more oxygenated and reformulated gasoline than legislation requires, because of the complexities of the gasoline distribution system. The more expensive gasoline will be sold in some areas that do not have substandard air quality, probably at a loss in margin. Chem Systems Inc. (CSI), Tarrytown, N.Y., estimates this spillover will be 30%. Other estimates are significantly higher.

Bonner & Moore Management Science, Houston, corroborates this conclusion generally. The company says, "Logistical considerations will extend the market range of reformulated gasoline well beyond the nonattainment area borders. A

OZONE NONATTAINMENT AREAS (96)

Extreme Areas

Los Angeles, Calif.

Severe Areas

Baltimore, Md.
Chicago, Ill., Ind., Wis.
Houston, Texas
Milwaukee, Wis.
Muskegon, Mich.
New York, N.Y., N.J., Conn.
Philadelphia, Pa., N.J., Del., Md.
San Diego, Calif.

Serious Areas

Atlanta, Ga.
Bakersfield, Calif.
Baton Rouge, La.
Beaumont, Texas
Boston, Mass., N.H.
El Paso, Texas
Fresno, Calif.
Hartford, Conn.
Huntington, W.Va., Ky., Ohio
Parkersburg, W.Va., Ohio
Portsmouth, N.H., Maine
Providence, R.I.
Sacramento, Calif.
Sheboygan, Wis.
Springfield, Mass.
Washington, D.C., Md., Va.

Moderate Areas

Atlantic City, N.J.
Bowling Green, Ky.
Charleston, W.Va.,
Charlotte, N.C., S.C.
Cincinnati, Ohio, Ky., Ind.
Cleveland, Ohio
Dallas, Texas
Dayton-Springfield, Ohio
Detroit, Mich.
Grand Rapids, Mich.
Greensboro, N.C.
Jefferson Co., N.Y.
Kewaunee Co., Wis.
Knox Co., Maine
Louisville, Ky., Ind.
Memphis, Tenn., Ark., Miss.
Miami, Fla.
Modesto, Calif.
Nashville, Tenn.
Pittsburgh, Pa.
Portland, Maine
Raleigh-Durham, N.C.
Reading, Pa.
Richmond, Va.
Salt Lake City, Utah
San Francisco-Oakland-San Jose, Calif.
Santa Barbara, Calif.
Smyth Co., Va.
St. Louis, Mo., Ill.
Toledo, Ohio
Visalia, Calif.
Worcester, Mass.

Marginal Areas

Albany, N.Y.
Allentown, Pa., N.J.
Altoona, Pa.
Birmingham, Ala.
Buffalo, N.Y.
Canton, Ohio
Columbus, Ohio
Erie, Pa.
Essex Co., N.Y.
Evansville, Ind., Ky.
Fayetteville, N.C.
Greenbrier Co., W.Va.
Greenville-Spartanburg, S.C.
Hancock, Co., Maine
Harrisburg, Pa.
Indianapolis, Ind.
Johnson Co.-Kingsport-Bristol, Tenn.
Johnstown, Pa.
Kansas City, Mo., Kan.
Knoxville, Tenn.
Lake Charles, La.
Lancaster, Pa.
Lewiston, Maine
Lexington, Ky.
Lincoln Co., Maine
Manchester, N.H.
Montgomery, Ala.
Norfolk, Va.
Owensboro, Ky.
Paducah, Ky.
Poughkeepsie, N.Y.
Scranton, Pa.
South Bend, Ind.
Stockton, Calif.
Sussex Co., Del.
Tampa, Fla.
Waldo Co., Maine
York, Pa.
Youngstown, Ohio-Sharon, Pa.

majority of the U.S. market is likely to be affected."

The costs

Ever since motor fuel changes were ordered by EPA, economists of many stripes have estimated what these changes will cost refiners. The highest estimate known here is $40-billion for the whole industry, which includes capital outlays and operating costs. This estimate is higher, but broader, than most others.

Some agreement is emerging in the area of $10-billion to $20-billion for industrywide investment in refining processes. Not included in these estimates are additional outlays that can go along with the changes, for example, segregating reformulated fuels within marketing and distribution systems, cleaning up ground and water pollution and reducing fugitive emissions into the air.

Ashland Oil Inc. estimates the cost will be $9-billion to $13-billion.

Wright Killen & Co., Houston, a consulting firm, estimates process investments will be $12-billion to $20-billion. For a refinery capable of 100,000 b/d of crude runs, a $20-million to $100-million investment would be needed.

The survey by CERA comes close to this. Total capital expenditures estimated by responding refiners, representing 44% of U.S. distillation capacity, were $7.1-billion. Extrapolating this estimate to the whole refinery population, the total is $16.1-billion.

The $7.1-billion estimate covers only three major categories of expected expenditures: $0.3-billion for crude-oil quality changes, $4.8-billion for anticipated changes in gasoline quality and $2.0-billion for low-sulfur diesel.

The average expenditure for the refining companies in the CERA survey for these three categories of expenditures is about $900/bbl. of crude distillation capacity. A 100,000 b/d refinery would spend $90-million. This agrees reasonably with the Wright Killen estimates.

Some 97% of surveyed refiners say they planned to invest in new refining facilities to manufacture reformulated gasoline, though not necessarily right away. The average estimated investment by refiners that provided estimates was $594/bbl. of crude distillation capacity. This includes refinery expansions and modifications, but excludes MTBE plants.

Gasoline specifications for the manufacture of MTBE for the year 2000 and beyond, which are supposed to be defined in 1992, will be more stringent and will require additional refinery investment.

Wright Killen concludes that faced with such expenditures, some refiners will be forced to divest assets, close some plants

and consolidate operations into fewer, larger plants, or abandon refining as a strategic business.

A closer look

Because CERA's estimates are based on actual responses from refiners, they offer an opportunity to delve deeper into what these investments mean to refiners of different sizes in different areas.

Midcontinent and Rocky Mountain refiners plan to spend far less per gallon of gasoline sold to nonattainment areas than refiners in the other areas of the United States. There are three major reasons for this difference:

- Some refiners plan to use exchanges to supply their ozone nonattainment markets rather than invest extensively in process changes. (The same is true for some small East Coast refiners who sell limited volumes of gasoline into nonattainment areas. However, the number for the East Coast is limited, since the East Coast market is dominated by nonattainment areas.)
- The percentage of reformulated gasoline per refiner is relatively small because there are fewer nonattainment areas, so that more of the requirement can be met through changes in blending.
- Many refiners will be affected only if ozone nonattainment areas opt in. As a result, they're delaying investments until they're clearer which areas will do so.

CERA concludes also that Gulf Coast refiners will invest more per gallon of gasoline sold in nonattainment areas than Midcontinent refiners, despite having roughly the same regional demand characteristics. This is due primarily to the large amount of gasoline exported from the Gulf area to the U.S. East Coast where demand for reformulated gasoline will be high.

In general, the refiners in the Gulf area that plan to invest the most per gallon of total gasoline production are those that depend most heavily on the East Coast markets. Gulf area refiners that sell most of their production within the region are planning to spend much less.

Economies of scale

Logically, environmental requirements should impact more heavily on small refiners than on large, because expenditures must be spread over less volume, but CERA didn't find that to be the case. It's because small refiners have alternatives that can help them avoid the heavier expenditures of larger refiners.

For example, small refiners east of the Rockies have alternatives to making major investments to produce reformulated gasoline. These alternatives generally result from access to markets in attainment areas or areas that may not require reformulated gasoline until after 1995.

Specifically, small refiners east of the Rockies can supply nonattainment areas through exchange, concentrate sales efforts on attainment areas and withdraw from nonattainment markets and reformulate only a portion of their gasoline pool.

CERA found that a combination of these three options is the planned strategy of several refiners responding to the survey. Smaller refiners are on average spending no more per barrel of gasoline produced than large refiners.

Larger refiners can't do the same because of their greater sales in nonattainment areas.

However, the expected economies of scale could emerge in the future if smaller refiners are forced to produce more reformulated fuel. This could occur if there are widespread opt-ins of ozone nonattainment areas, if current nonattainment areas are redefined on a broader geographic basis, such as statewide, and if the distribution system proves unable to handle multiple grades, forcing refiners to sell significant volumes of reformulated gasoline into areas where it is not required.

In CERA's view, refineries east of the Rockies have more flexibility in meeting CAAA requirements, but they may be narrowing their opportunities by cutting themselves off from future participation in nonattainment markets. Moreover, the small refiner that delays investment runs the risk of being at a more severe disadvantage to the larger refiner than might otherwise have been the case.

Economies of scale didn't show up on the West Coast either, but for different reasons. CERA says small refiners there have only three alternatives: (1) to make the investments necessary to produce 100% reformulated gasoline, (2) to discount their gasoline sufficiently to make its export consistently possible, or (3) to sell their gasoline as an unfinished blending component at a significant discount.

CERA says that faced with these alternatives, small West Coast refiners surveyed plan to take the first alternative: make 100% reformulated gasoline. But some of the smaller refiners didn't respond to the survey, and CERA cautions that refiners who answered operate only 24% of the total capacity of the region and represent primarily the midsized refiners. The generalization might not apply to smaller refiners.

Recovering the investment

Because of the wide range of plans to manufacture reformulated gasoline and diesel fuel, some refiners are likely to find ways to do it more economically than others. Petroleum processing is a complex technology that allows different approaches, some costlier than others and with varying efficiencies. Capital costs vary, too.

Refiners that make the transformations most efficiently will have lower costs and will therefore be in a position to establish the price levels. In other words, the cheaper product will tend to set the price. As costs get passed through to the marketplace, the less efficient will likely not be able to recover their costs fully, if anybody does.

The $290-million hydrocracker/reformer units at the Valero refinery in Corpus Christi, Texas, began operations in January 1992. The hydrocracker is the large unit in the right foreground of the picture, while the reformer consists of the two tall structures in the left background.

Estimates of Gasoline, MTBE Demand in CO Nonattainment Areas*

	Population (000)	Gasoline Demand (000 b/d)	MTBE Equivalent Demand During Winter Months (000 b/d)*
PADD 1	37,595	922	138
PADD 2	6,657	206	31
PADD 3	1,079	35	5
PADD 4	2,753	81	12
PADD 5	33,094	1,024	154
U.S.	81,178	2,269	340

Sources: Stastical Abstract of the U.S.; Cambridge Energy Research Associates
** Assumes no spillover into other areas, although considerable spillover is expected.*
Note: PADD 1, East Coast; 2, Midwest; 3, Southwest; 4, Rockies; 5, West Coast

Production of MTBE and other oxygenates required for carbon monoxide nonattainment areas will be short this winter, but most analysts believe stocks built up in advance of the season are likely to carry through. With the wide variation in requirements from region to region, however, supplies could be short in some areas, particularly the East and West Coasts.

The potential risk of unrecovered costs depends on the range of expenditures that will be required for each reformulation. In the case of reformulated gasoline required by 1995, CERA estimates the total costs—production, purchased components, and capital—will average 11.4¢/gal.

Production costs will be 5.7¢/gal. more than for conventional gasoline. Capital costs, plus a 15% rate of return, are estimated to average 3.2¢/gal. Costs for refiners on the West Coast would be about 30% higher than this national average.

The cost of oxygenate purchased in excess of the volumes that can be produced at refineries is estimated to add an average of about 2.5¢/gal. of reformulated gasoline nationwide.

These investments do not reflect the more stringent reformulations required in 1997 and even more stringent reformulations in 2000.

The manufacture of low-sulfur diesel fuel is estimated to cost 4-7¢/gal., including capital recovery and operating costs.

The variable cost of capital also will determine how much of the expenditures can be recovered in the marketplace. Small refiners are more likely to require external debt financing. CERA reports there has been uniform lack of interest by financial institutions in low-cost alternatives, such as project debt or joint ventures, thus requiring the use of higher-cost corporate debt securities.

Large refineries in integrated oil companies have access to cheaper, internal capital. They have deeper pockets and stronger staying power.

Some analysts believe small refiners have inherently poor economics and won't be able to comply with the new regulations. One sets 25,000 b/d as the breaking point, and thinks all 50 could fail, shutting down 500,000 b/d of crude capacity. He thinks even refiners with up to 50,000 b/d could also fail, shutting down another 1.5-million b/d of capacity. He says 500,000 b/d is the least that will go offstream.

The analyst's point is that enough refining capacity will be shut down in the next two or three years to shrink refining capacity and cause profit margins—and prices—to increase. Even if this doesn't take place nationally, it will probably happen in some refinery areas.

Calif. revolution

Federal regulations are causing refiners a multitude of problems, that's clear. And then there's the case of California. Refiners that sell or want to sell gasoline or diesel fuel in that state are looking into the regulatory jaws of the next century.

As exceptional as California's reformulated gasoline recipe may be, it won't be for long. Washington, D.C., and most Northeast states have adopted the program, plus Virginia. Many other states are sure to follow.

The EPA, however, appears to be planning to move slower. The EPA will further tighten the screws on gasoline by 1997, and still more by 2000, but may not reach California's degree of strictness. One reason is that uniform federal standards would cover many geographical areas that don't need such Draconian measures.

California put strict limits on just about every gasoline specification: RVP, sulfur, aromatics, benzene, olefins, oxygen and distillation range [*NPN*—Jan. '92, p19]. Every refiner except Arco complained that the regulations were excessive and their goals could be accomplished for a lot less, but Arco wants gasoline to be made so clean, methanol fuel couldn't compete.

U.S. auto manufacturers also support strict regulations so that they can meet their own mandated emission standards.

Beginning in 1996, all major and two large independent refiners (55,000 b/d and over) in California will have to meet the stringent new formula. In 1998, small refiners will be included. The California Air Resources Board (CARB) estimated the changes would cost consumers 12-17¢/gal. and refiners $2.5-billion. California refiners estimated the cost would be 20-28¢/gal. for consumers and $6-billion to $10-billion for refiners.

California's oxygen standard for gasoline is 1.8-2.2% by weight in winter. The 2.2% cap restricts ethanol content to 6%, which doesn't qualify for the 5.4¢/gal. federal tax exemption on gasohol (10% ethanol). Ethanol interests argued for no cap or a 3.5% cap, which would've permitted blending 10% ethanol into gasoline. The state contends too much oxygen worsens nitrogen oxide omissions.

As mentioned earlier, CERA says responding midsized refiners and some

Percentage of Gasoline Sales in Nonattainment Areas

	Carbon Monoxide (Worst 9, 1995)	Ozone (All 41, Nov. '92)
PADD 1	39%	67%
PADD 2, 4	12	41
PADD 3	3	29
PADD 5	82	69
U.S.	32%	52%

Source: Cambridge Energy Research Associates
Note: PADD 1, East Coast; 2, Midwest; 3, Southwest; 4, Rockies; 5, West Coast

The burden on refineries to meet gasoline reformulation deadlines varies dramatically by region depending on the amounts of gasoline supplied to nonattainment areas. The greatest variation is between PADD 3, the Southwest, and PADD 5, the West Coast, for CO monattainment areas. Most refiners in PADDs 2 and 4 are focusing expenditures on upgrading distillate quality since diesel fuel accounts for a large portion of their middle-distillate sales. Overall, refiners in PADDs 1 and 3 will produce a larger portion of their products for nonattainment areas than those in PADDs 2 and 4. Refiners in PADD 5 have the greatest expenditures, mainly because all refineries there are producing for markets that are nonattaining for all major categories of pollutants.

small refiners on the West Coast plan to make 100% reformulated gasoline. What the rest of the smaller refiners will do isn't known, and it is cause for considerable concern to oil marketers. Some, no doubt, will decide to shut down. In fact, two recently shut down—they say temporarily—because product prices were so poor.

If most refiners have made peace with California's gasoline regulations, they have not done so with the diesel fuel regulations. They say a limit of 10% aromatics probably cannot be achieved. Some have already announced they won't market diesel fuel in California.

Beginning Oct. 1, 1993, both California and the EPA mandate reduction of sulfur to 0.5% by weight. Technology exists and investment decisions have already been made to accomplish this. A California Energy Commission (CEC) study estimates that this will cost large refiners 1-3¢/gal. and small refiners 7-51¢/gal.

CARB has taken the additional step of requiring that large refiners limit aromatics in all on-highway diesel sold in the state to 10% by volume, and small refiners to 20%. The EPA is satisfied nationally to keep diesel aromatics at current levels. Refiners can accomplish this two ways: either with a minimum cetane index of 40 or with an aromatics limit of 35%. This is not a problem for refiners.

The CEC study estimates that the combined costs of the sulfur and aromatics limits for large refiners, would be 11-28¢/gal. and for small refiners 16-70¢/gal.

The CEC study concludes, "The cost disadvantage to small refiners is significant and may render them unable to compete in California's diesel market."

CEC says, too, "Uncertainty about certification of an alternative diesel fuel will be a factor in investment decisions. If the industry perceives the uncertainty as too great, capital investment could shift to other segments of the refining process, such as oxygenated fuels, reformulated gasoline, or aviation fuels. Diesel supplies would thereby be reduced.

"If the industry is unable to meet the new regulations in the time allotted, or chooses to market diesel fuel outside California rather than invest in refinery modifications, a supply shortage within the state may occur."

CEC says refiners could choose to sell their conventional diesel fuel across the state border, causing prices to rise in California, which would be especially harmful for trucking and agriculture.

Keeping tabs

The toll on refiners has begun and will gain momentum the next few years. A key to a marketer's future is planning ahead, as much as possible, for refiner cutbacks, pullouts and failures. Some marketers may decide to establish better bonds with major oil companies and independents committed to survive.

The majors that make the necessary changes most efficiently will be in the strongest competitive position. It bears watching.

Marketers can mull the many pros and cons of branding up, but they'd be missing the point, under present and near-term circumstances, if they didn't rate guarantee of supply at or near the top. There's no assurance, of course, that all majors will stay in all the markets they're in now, but they're not going to pull out because they can't produce the quality of motor fuel mandated in polluted areas.

Major oil companies and large surviving independents are likely to produce as much gasoline and diesel fuel saleable anywhere as they are producing now, maybe more. Small refiners and independents that don't have the financial means to make necessary refinery modifications may have to reduce production of gasoline and diesel fuel in some markets, or even entirely.

Knowing all this in general is not good enough. Each marketer must do his or her own homework, keeping tabs on all current and prospective suppliers. Almost all refiners are playing their cards close to their vests. There may not be much warning if they decide to throw them in. npn

OXYGENATES
Crisis Within a Crisis

If you had purchased a piece of an MTBE (methyl tertiary butyl ether) manufacturer a couple of years ago, you'd be holding a valuable property now. There's a run on the leading oxygenate, and many refiners fear there may not be enough to go around this winter.

Beginning in November this year, gasoline sold in 41 metropolitan areas in the U.S. that currently fail to meet the Environmental Protection Agency (EPA) standards for atmospheric carbon monoxide (CO) in the winter must contain 2.7% oxygen by weight (see box).

Cambridge Energy Research Associates (CERA), in an estimate based on a population of 81.178-million in the CO nonattainment areas, concluded gasoline demand will be 2.269-million b/d next winter, requiring 340,000 b/d of MTBE equivalent. Needed supplies will be greater than this, however, because sales of oxygenated gasoline spill over into other areas in the nature of the distribution system.

Analysts say oxygenate supply will also have to include ethanol and TAME (tertiary amyl methyl ether). Ethanol, because of its cost, will be used mostly in areas where it is subsidized. There are several other ether candidates being tested in laboratories, but MTBE is the only one now used widely in gasoline blending.

There's no consensus whether refiners and blenders will run into oxygenate supply troubles next winter. CERA concludes optimistically, "Oxygenate supplies for the winter 1992-'93 are expected to be adequate. Production capacity during the winter will fall short of requirements by 46,000 b/d to 126,000 b/d, but the industry should be capable of building inventories in advance to fill the gap."

This is a middle-of-the-road assumption. In a worst-case view, CERA says supplies from current production and imports could fall short of demand by 213,000 b/d. In a best-case view, supply could exceed demand by 24,000 b/d and no prestocking of oxygenates would be required.

Under any of these cases, California will import the vast majority of its oxygenate supplies from Canada and other areas of the United States.

Chem Systems Inc. (CSI), Tarrytown, N.Y., says that to meet projected demand, including spillover, an additional 100,000 b/d of MTBE from storage is required, and this is "highly unlikely."

Bonner & Moore, management consultants, forecasts MTBE capacity will reach 160,000 b/d by next winter and be about 150,000 b/d short of the peak season requirements. Imports could offset about 50,000-60,000 b/d of the shortfall, they say, but this is not enough and EPA will delay enforcement or lower required levels.

A genuine shortage could hardly be considered noncompliance by EPA. When CERA surveyed MTBE manufacturers, it found a large number of plants in various stages of planning or construction. CSI says that by 1995, when clean-fuel requirements expand from CO nonattainment areas to include nine ozone nonattainment areas, significant new supplies of MTBE and TAME will be available. Everybody agrees manufacturing capacity isn't sufficient, but hopes are pinned on imports and MTBE inventories that have been built up in preparation for winter.

NPN Exclusive Survey

Retail Outlet Count Edges Down, But Is Still Over 200,000

Early in 1992, there were 202,443 retail outlets in the United States selling gasoline to the motoring public. This figure represents a decline of 7,677 outlets (3.8%) compared to the total outlet population of 210,120 reported during the same period in 1991.

The decline in the retail gasoline outlet population should come as no surprise to anyone who has been following events in the petroleum market over the past year. Economic recession, reduced product demand, volatile price swings and burdensome environmental regulations have taken their toll, particularly among retailers with marginal facilities. The surprise, perhaps, is that under these circumstances, less than 4% of retail outlets have gone under.

This latest population count is derived from the second-annual retail gasoline outlet survey conducted by the editorial staff of *National Petroleum News*. To compile this data, *NPN* staff members contacted officials in every state in the union and the District of Columbia.

NPN adopted this survey method last year to provide the petroleum marketing industry with a more accurate and confirmable universe figure than the hodgepodge of guesses and highly selective and limited "counts" that have been circulating in the past 10 years or so.

Early in 1991, *NPN* set out to determine the total number of places where motorists can buy gasoline for their vehicles at retail pumps [*NPN*—April '91, p26]. This includes conventional "service stations," convenience stores, car washes, unattended outlets, truckstops, garages, etc.; anywhere that gasoline is sold at retail. Unfortunately, many thousands of these facilities have been ignored or have simply slipped through the cracks in previous market surveys.

This new counting concept dispenses with the arbitrary definition of "gasoline service stations" adopted by the U.S. Census Bureau's, *Census of Retail Trade*, conducted every five years. In its last two official nose counts—in 1982 and 1987—the Census Bureau simply lopped off tens of thousands of legitimate gasoline retail outlets. The Bureau eliminated Mom-and-Pop retail outlets and counted only those with employees and formal payrolls. What's more, they classified as "service stations" only those outlets that generated 50% or more of their annual revenue from gasoline sales.

Under the Bureau definition, a convenience store selling $700,000/yr. of store merchandise, for example, and $680,000/yr. of gasoline (about 50,000 gal./mo.) would be excluded from its tally.

The Census Bureau's survey methodology, using the 50%/payroll definition, largely discounts the tremendous growth of the convenience store presence in the petroleum market during the past 15 years or thereabouts. *NPN*'s survey, on the other hand, counts these neglected C-store/gasoline combinations, along with all other retail gasoline facilities orphaned by the Bureau's tally.

202,443

Target the states

Lacking data from government or any other national source that reflected the true dimensions of the retail gasoline market, *NPN*'s survey task force—including editors Angel Abcede, Steve Dwyer, Mark Emond, Alicia Lasek, Greg Lindenberg and Don Smith—focused its numbers quest at the state level.

It should be noted at the outset that many states do not have "official" figures or procedures for isolating, for counting purposes, retail gasoline outlets from other types of business. This includes the motor vehicle, licensing and tax departments or divisions in more than half of the states.

The lack of official counts by many of these departments prompted *NPN*'s survey staff to pursue other responsible sources in state administrations who have reasonable knowledge of their state's gasoline marketplaces and are in a position to make reliable estimates. These included officials with state weights and measures departments which, while not responsible for station totals, were responsible for tracking every retail gasoline pump in operation.

NPN also contacted key trade association executives because of their specialized knowledge of their markets.

By *NPN* Staff

As a result, approximately two-thirds of the figures compiled by *NPN* are "hard" numbers—figures based on registration, licensing and tax division reports. The data for the remaining one-third of these states range from unofficial estimates to "guesstimates" in a couple of states based on the best available information.

Accounting for differences

A review of the state data in the accompanying table would seem to indicate some of the state totals are out of whack, in terms of the ratio of outlets to total state population, especially when compared to the numbers in other, more populous states.

State demographics such as urban-rural concentrations figure prominently in determining the number of outlets a particular state has.

North Carolina, for example, reported a outlet count of 10,244 at the beginning of this year, a much higher figure than those reported for several more populous states. North Carolina has a very accurate annual reporting procedure that collects all retail gasoline outlet data on a county-by-county basis, indicating that the state's numbers are highly reliable. But, as one state association official points out, the state has a much higher proportion of small, rural, 10,000-20,000 gal./mo. locations, giving North Carolina a higher per capita outlet count than more populous states such as New York.

It's interesting, too, to compare North Carolina's detailed state-generated numbers for 1991 with those "50 percenter" stations tallied in the Census Bureau's 1987 figures. The state people came up with a total almost three times the number recorded by the Bureau. It appears there are over 6,000 retail gasoline outlets in the state that the world didn't know about until last year.

For this 1992 report, *NPN*'s staff has fine-tuned the research and the data presented for a few states, based on more reliable information being available this time around. Illinois is one example. Last year, despite contacts with every source *NPN* could identify, the numbers published for the state, which were based on an "educated guess" offered by an Illinois state official, turned out to be unrealistically high, to say the least. This year, a thorough search by staffers turned up a more reliable and authoritative number from a source at Illinois' Weights and Measures Div.

As indicated in last year's report, *NPN* plans to update its state-by-state outlet tally every year. Since some states are already improving their counting procedures, it's expected that future surveys will become more accurate with each passing year. npn

1992 Retail Outlet Population

	Total Outlets			
	NPN Survey		Census Data	
	1992(a)	1991(a)	1987(b)	1972(c)
Alabama	6,500	6,500	2,229	4,510
Alaska	296	300	214	241
Arizona	2,425	4,010	1,241	2,357
Arkansas	3,592	3,764	1,357	3,144
California	13,140	13,800	9,812	19,513
Colorado	3,281	3,400	1,568	3,170
Connecticut	1,850	1,900	1,671	2,798
Delaware	508	450	279	557
Dist. of Col.	180	134	115	318
Florida	10,062	10,152	5,933	9,199
Georgia	7,000	7,000	3,273	6,730
Hawaii	407	392	355	480
Idaho	1,073	1,123	588	1,193
Illinois	5,749	10,100	4,655	10,211
Indiana	3,901	4,500	2,854	6,235
Iowa	3,783	4,169	2,020	2,613
Kansas	2,896	3,062	1,576	3,609
Kentucky	2,360	2,446	2,058	3,921
Louisiana	9,497	6,600	1,934	3,921
Maine	1,500	700	673	1,224
Maryland	2,245	2,450	1,846	3,012
Massachusetts	4,500	2,500	2,738	4,698
Michigan	6,905	8,500	4,164	8,919
Minnesota	3,157	3,598	2,289	4,585
Mississippi	6,127	6,000	1,374	2,727
Missouri	5,895	7,200	3,119	6,280
Montana	1,432	1,400	548	1,190
Nebraska	2,008	3,000	1,163	2,265
Nevada	694	450	441	798
New Hampshire	1,069	1,050	534	888
New Jersey	3,800	3,860	3,791	5,768
New Mexico	1,858	2,066	696	1,831
New York	7,000	6,800	5,982	11,359
North Carolina	10,244	10,643	3,547	6,946
North Dakota	983	1,245	471	910
Ohio	6,632	6,205	5,362	11,723
Oregon	2,091	2,165	1,352	2,828
Oklahoma	4,450	4,700	1,705	4,153
Pennsylvania	5,790	6,000	5,192	11,256
Rhode Island	703	602	487	901
South Carolina	4,776	5,200	1,833	3,720
South Dakota	1,245	1,245	556	1,171
Tennessee	6,000	6,000	2,491	5,157
Texas	9,900	11,000	8,568	17,118
Utah	2,116	2,137	849	1,504
Vermont	854	856	369	596
Virginia	6,400	6,000	2,740	4,648
Washington	5,306	3,500	2,003	3,945
West Virginia	2,700	2,800	1,013	2,156
Wisconsin	4,388	5,074	2,735	5,182
Wyoming	1,175	1,372	415	772
Total U.S.	202,443	210,120	114,748	226,459

(a) This compilation embraces all outlets where gasoline is sold at retail. It includes service stations, convenience stores, car washes, etc., a universe, in effect, of retail gasoline outlets. The surveys were completed in March 1992 and January 1991, respectively.
(b) These are the U.S. Bureau of the Census figures for 1987, but include only those service stations that have employees and payrolls and generate more than half their income from gasoline sales. Automatically excluded were convenience stores, car washes, etc.
(c) These are the U.S. Bureau of the Census figures for 1972 and are generally considered a "universe count" because only a handful of places, beyond orthodox service stations, sold gasoline at retail at that time.

Sources: NPN state-by-state telephone survey for 1992 and 1991; U.S. Bureau of the Census, Census of Retail Trade, 1987 and 1972.